DOE/RL-98-35
Revision 3

Surveillance and Maintenance Plan for the Plutonium-Uranium Extraction (PUREX) Facility

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

United States Department of Energy
P.O. Box 550
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ACRONYMS

ALARA	as low as reasonably achievable
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	*Code of Federal Regulations*
CRD	Contractor Requirements Document
Cs	cesium
DOE	U.S. Department of Energy
EMS	Environmental Management System
FHA	fire hazard analysis
HEPA	high-efficiency particulate air
I&C	Instrumentation and control
KVA	Kilovolt-amps
ISMS	Integrated Environmental Safety and Health Management System
QA	quality assurance
QAPD	Quality Assurance Program Description
RCRA	*Resource Conservation and Recovery Act of 1976*
RL	Richland Operations Office
S&M	surveillance and maintenance
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and/or disposal
TWRS	Tank Waste Remediation System
WAC	*Washington Administration Code*
WDOH	State of Washington, Department of Health

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SURVEILLANCE AND MAINTENANCE PLAN FOR THE PLUTONIUM URANIUM EXTRACTION (PUREX) FACILITY

1.0 INTRODUCTION

The Hanford Federal Facility Agreement and Consent Order, referred to as the Tri-Party Agreement ensures compliance with the *Resource Conservation and Recovery Act of 1976* (RCRA) and the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), as amended. The Tri-Party Agreement sets forth certain requirements and milestones for cleanup activities at the Hanford Site.

This document provides the plan for the surveillance and maintenance (S&M) phase of the Plutonium-Uranium Extraction (plant) (PUREX) Facility. This plan has been prepared in accordance with the Tri-Party Agreement, Attachment 2 (Tri-Party Agreement Action Plan), Section 8.6, "Surveillance and Maintenance Phase" and will remain in effect until the Remedial Design/Remedial Action Work Plan has been approved. The objectives of the S&M phase are to ensure adequate containment of any contaminants left in place and to provide physical safety and security controls and to maintain the facility in a manner that will minimize risk to human health or the environment. S&M plans are prepared by U.S. Department of Energy (DOE), Richland Operations Office (RL) and detail facility aspects and associated requirements including the following: (1) surveillance, (2) maintenance, (3) quality assurance, (4) radiological controls, (5) hazardous substance inventory, management and protection, (6) health and safety/emergency preparedness, (7) safeguards and security, (8) cost and schedule, and (9) environmental compliance. A list of the buildings managed as part of the PUREX facility S&M Plan or a list of implementing procedures can be obtained by contacting the manager of the project responsible for managing PUREX.

The enforceable requirements in this document are found in Table 6-1, other dialogue and descriptions are for informational purposes only.

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2.0 FACILITY ACTIVITIES

Surveillance and maintenance activities conducted during the S&M phase are established to monitor containment of contaminants left in place, to provide physical safety and security controls, and to maintain the facility in a manner that will minimize risk to human health or the environment. Waste generated while performing S&M activities will be dispositioned according to waste handling regulations.

2.1 HISTORICAL BACKGROUND

This section of the PUREX S&M plan discusses the facility's operational history including prior usage of the facility, previous processes that resulted in hazardous and radioactive contamination, and completed disposition activities.

The PUREX facility was designed and operated to recover plutonium, uranium, and neptunium from irradiated fuel elements received from the 100 N Reactor and the single-pass reactors on the DOE Hanford Site. Construction of PUREX began in 1952 and the facility began operating in 1956. The operation was shut down in September 1972. The facility was maintained in wet-standby mode until 1978, with process and support equipment operating on a regular basis. Failed equipment was either upgraded or replaced. From 1978 to 1983, the facility progressed from wet standby through cold start-up tests and resumed operations to recover plutonium from irradiated fuel in November 1983. The PUREX facility was fully operational until 1988 when it was again shut down. The facility began transitioning into a cold-standby mode in October 1990, and was placed in cold standby in September 1992. In December 1992, planning was started to transition the PUREX facility from cold-standby mode to S&M. Transition (deactivation) was completed in 1998 and the facility has been in the S&M phase since that time.

End point criteria developed to define the transition (deactivation) activities for PUREX were defined in WHC-SD-WM-TPP-053, *PUREX Deactivation End Points*. Completion of these activities established a safe and environmentally secure configuration suitable for a long-term S&M program.

Not all the hazardous materials were removed during the transition phase. Those hazardous materials remaining in the facility are listed in Appendix A, *Hazardous Materials Remaining at the PUREX Facility*.

2.2 FACILITY DESCRIPTION

This section of the S&M Plan describes the major structures and operations of active systems; including status of systems such as ventilation, fire protection, radiation detection, remote monitoring, utility distribution, compressed air, and water.

The PUREX Facility S&M includes the 202-A Building, ancillary buildings, and their associated equipment within the PUREX perimeter fence and encompasses approximately 59 buildings and structures listed in Table 2-1 "PUREX Facility Structures and Components" (see Plot Plan in Figure 2-1).

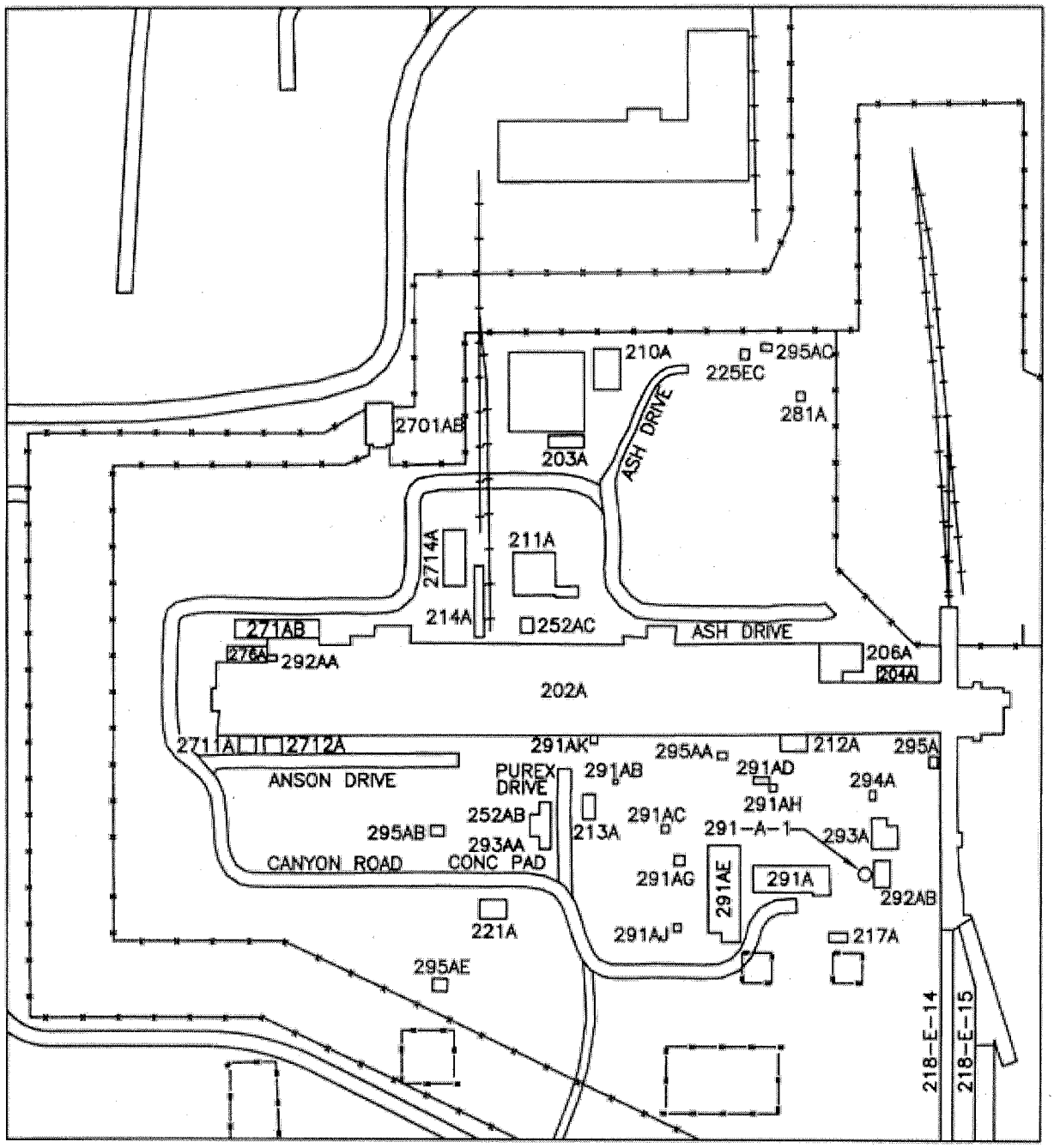

Figure 2-1. PUREX Plot Plan.

The PUREX facility is composed of the main canyon (202-A) building and several support structures, including two annex buildings (the office annex and the laboratory annex) located on the north side of the canyon. Two below-grade tunnels containing contaminated equipment extend southward from the east end of the 202-A Building. In addition, other facilities (tank farms, cribs, and retention basins) were used to support PUREX during processing operations.

2.2.1 Inactive Waste Sites

The scope of the S&M program is limited to the facilities described in Section 8 of the Tri-Party Agreement Action Plan (Ecology, et al., 2003); therefore, waste sites are not addressed in this document.

2.2.2 Operational Systems Description

The canyon ventilation system, electrical system, the surveillance, monitoring, and control system (SAMCONS); and surveillance lighting system are the only systems operating during the PUREX S&M phase.

2.2.2.1 Electrical

The original electrical distribution system to PUREX is isolated and disconnected. Two new electrical substations and transformers supply power to the canyon ventilation system, dedicated surveillance lighting, and monitoring system. The main substation, located south of 202-A Building, provides1500 kilovolt-amps (KVA) of electrical power to 292-A, 291-AH, SAMCONS instrumentation and control (I&C) Skid, 291-A, ventilation system fans and components, miscellaneous support loads, and the surveillance lighting system.

Surveillance lighting is located throughout the 202-A surveillance routes and ancillary buildings requiring routine access. The lighting has a disconnect external to the 202-A Building and is energized only when performing surveillance. In addition, electric heat and cooling are supplied to the 291-AE and 292-AB buildings to protect instrumentation from extreme temperature variations.

2.2.2.2 Canyon Ventilation System

The PUREX deactivation project reduced the four separate ventilation systems in the facility to one flow scheme and the one main exhaust stack. There are two main exhaust fans (one active and one on standby) which continue to function. No supply fans are operational. Therefore, with the exception of the active portions of the 202-A ventilation system described here, all PUREX ventilation systems (including high-efficiency particulate air [HEPA] filters and stacks) are capped and isolated to prevent unintended releases to the atmosphere.

For the S&M period, two main exhaust fans are provided; only one of which is required to be operating at any time. One fan is operating to ventilate the building, and the other fan remains on standby.

The major portions of the 202-A Building ventilation system that remain active are deep-bed Filter No. 2, portions of the No. 4 Filter bank (291-A-1 stack HEPA filters in the 291-AE Building), 291-A Building electric exhaust fans, air tunnels, 292-AB building, and sampling instrumentation. Service areas, including the process and canyon blower rooms, the compressor room, office areas, and AMU are not ventilated. All ventilation in the laboratory area has been shut down.

2.2.2.3 Instrumentation, Monitoring, and Control System

A distributive computer monitoring and control system with remote capability is located in the SAMCONS I&C skid unit (217-A) and provides data acquisition for monitoring data and controls for the ventilation system exhaust fans and, stack flow and sampling system and miscellaneous parameters.

2.3 SURVEILLANCE ACTIVITIES

This section describes the surveillance activities to be conducted on a routine and non-routine basis by the S&M contractor. Routine activities ensure that structural and passive confinement integrity is maintained. Non-routine activities include major responses to undesirable observations (e.g., action to be taken if damaged friable asbestos is present).

In addition, surveillance activities must satisfy the inspection requirements as identified in Section 6.0, Environmental Compliance/Protection, Table 6.1, "PUREX Regulatory Compliance During Surveillance and Maintenance."

2.3.1 Environmental Monitoring of the Canyon Ventilation System Stack

The Canyon Ventilation System Stack remains designated as a major stack in accordance with the National Emissions Standards in Hazards Air Pollutants (NESHAP) criteria, Title 40 *Code of Federal Regulations* (CFR) Part 61, Subpart H. This designation is due to the stack's potential to emit radionuclides into the air that could cause an effective dose equivalent to any member of the public in an unrestricted area in excess of 0.1 millirem per year. Since operations supplying airborne radionuclides to the S&M ventilation system are not expected during S&M, monitoring activities have been reduced to a minimum, yet still meet the U.S. Environmental Protection Agency's requirements and the State requirements of *Washington Administrative Code* (WAC) 246-247, *Radiation Protection – Air Emissions*. Environmental sampling of the PUREX main ventilation stack emissions during the PUREX S&M phase consists of stack effluent particulate sampling (as licensed with the State of Washington, Department of Health), designed to allow an accurate radionuclide release record for the stack.

2.3.2 Annual Surveillance

Walk-through surveillance of the PUREX facility will be conducted and documented annually by the S&M contractor to include the Case 1 spaces (routine access) and Case 3 spaces (external areas), as described in WHC-SD-WM-TPP-053, parts of the 202-A (AMU, galleries, and other selected areas), operational structures supporting the ventilation system, and outdoor areas. The annual S&M contractor's walk-through surveillance includes checking for indications of:

- Internal and/or external structural defects,
- Roof deterioration,
- Posting deficiencies,
- Contamination migration,
- Suspect hazardous materials,
- Hazardous conditions,
- Electrical hazards,
- Unidentified friable asbestos,
- Failed lights,
- Doors unlocked,
- Water leaks,

- Excess combustible materials,
- Excess equipment or material,
- Ground subsidence,
- Inadequate housekeeping,
- Occupational hazards,
- Previously unidentified hazards,
- Unidentified or unlabeled containers, and
- Animal or insect intrusion.

In addition, routine general housekeeping such as tumbleweed and miscellaneous debris removal is performed throughout the PUREX complex.

Indoor surveillance will consists of a walk through of the 202-A, 202-A annex, maintenance shops, pipe and operating gallery level, storage gallery level, AMU basement, office and lunchroom area, the hot cell lobby, N-Cell (upper and lower levels), product removal (PR) corridor, PR room, Q-Cell, canyon lobby, white room, and the west stairwell.

The outdoor surveillance will consist of external monitoring and visual inspections of the facility's ancillary buildings and supporting areas including the outdoor contaminated areas.

In addition to the annual walk through surveillance, a qualified contractor structural engineer will conduct an inspection of the roof and structures of those facilities that provide a passive confinement function. The frequency, extent of future inspections, and recommendations resulting from these periodic inspections will be documented by the contractor structural engineer.

2.3.3 Routine Surveillance

Routine surveillance governed by S&M contractor operations, maintenance, and radiological work packages, and procedures are performed in addition to annual walk-through surveillance to ensure adequate facility S&M phase operation. These S&M contractor's documents establish the frequency and activities necessary to monitor, control, and thereby preclude potential health and safety impacts and equipment failure.

S&M contractor's documents also describe the preventive maintenance and instrument calibrations to maintain the remaining active equipment. The radiation protection procedures, radiation work permit (RWP), and radiological condition assessments describe the radiological control activities such as posting, access control, work place air monitoring, and radiological surveys.

Table 2-1. PUREX Facility Structures and Components.

Identification No.	Function/Description
202-A	PUREX Canyon Building
203-A	Acid Pump House/Acid Storage and Handling Facility
204-A	U-Cell/ Acid Storage Vault
206-A	Fractionator Building
210-A	Drum Storage
211-A	Bulk Cold Chemical Tank Farm
212-A	Fission Product Load Out
213-A	Fission Product Load In
214-A	PUREX Facility Warehouse
217-A	Surveillance, Monitoring and Control System (SAMCONS) Instrument and Control (I&C) Unit
218-E-14	PUREX Storage Tunnel 1
218-E-15	PUREX Storage Tunnel 2
221-A	Storage Building
225-EC	Treatment Effluent Disposal Facility (TEDF) Monitoring Building
252-AB	Main Electrical Switchgear Substation
252-AC	Surveillance Lighting Electrical Substation
2701-AB	Badge House
2711-A	Air Compressor Building
2712-A	Pump House
2714-A	Chemical Warehouse
271-AB	PUREX Maintenance Facility
276-A	R Cell
281-A	Emergency Generators Facility
291-A	Exhaust Fans
291-A-1	202-A Main Stack
291-AB	Exhaust Air Sample Shack
291-AC	Exhaust Air Instrument House
291-AD	Ammonia Off-Gas Filter Building
291-AE	#4 Filter Building
291-AG	Sample Station #2
291-AH	Ammonia Off-Gas Sample Station
291-AJ	Sample Station #3
291-AK	Air Tunnel Enclosure
292-AA	PR Stack Sample House
292-AB	Gaseous Effluent Monitoring Building (Main Stack Building)
293-A	Dissolver Off-Gas Station
293-AA	Former Hydrogen Peroxide Storage (Concrete Pad Remaining)
294-A	Off-Gas Instrument Shack
295-A	ASD Sample Station
295-AA	SCD Sample/Pump Station
295-AB	PDD Sample Station
295-AC	CSL Sample Station
295-AD	CWL Sample Station
295-AE	PDD Monitoring Building

3.0 FACILITY MAINTENANCE

This section describes the methodology applied by DOE to ensure that the S&M contractor establishes preventive and corrective maintenance activities to be performed. Preventive maintenance is conducted on a prescheduled basis to ensure proper functioning of operational equipment. Corrective maintenance is performed after equipment has malfunctioned, has required structural repair due to degradation, or to upgrade facilities and/or equipment.

3.1 MAINTENANCE ORGANIZATION AND ADMINISTRATION

The DOE requires the S&M contractor to develop and implement plans, programs, and procedures that specify maintenance program requirements for nuclear and non-nuclear facilities required by Contractor Requirements Document (CRD) O 433.1, *Maintenance Management Program for DOE Nuclear Facilities*, and CRD O 430.1B, *Real Property Asset Management*. The DOE conducts oversight of the S&M contractor's maintenance program implementation.

CRD O 433.1 specifically mandates that the S&M contractor implement a maintenance management program using a graded approach and that the maintenance management program shall address the following elements, as appropriate:

- Maintenance Organization and Administration
- Training and Qualification of Maintenance Personnel
- Maintenance Facilities, Equipment, and Tools
- Types of Maintenance
- Maintenance Procedures
- Planning, Scheduling, and coordination of Maintenance
- Control of Maintenance Activities
- Post-maintenance Testing
- Procurement of Parts, Materials, and Services
- Receipt, Inspection, Handling, Storage, Retrieval, Issuance, and Disposal Turn In of Personal Property
- Control and Calibration of Measuring and Test Equipment
- Maintenance Tools and Equipment Control
- Facility Condition Inspection
- Management Involvement
- Maintenance History
- Analysis of Maintenance Problems
- Modification Work
- Seasonal Facility Preservation.

3.2 TYPES OF MAINTENANCE

A proper balance of routine and preventive maintenance is employed to provide a high degree of confidence that facility equipment degradation is identified and corrected. Preventive and routine maintenance is conducted as described S&M contractor work control procedures.

3.3 TYPES OF MAINTENANCE AND FREQUENCY

The following maintenance and frequencies are recommended to satisfy code and specification, manufacturer's recommendations, and to ensure optimum equipment operating life during the S&M program.

• Inspect and lube canyon exhaust fans and bearings EF-1 and –3	As recommended in procedures
• Calibration of equipment controlled by canyon ventilation instrumentation and control system	As recommended in procedures
• High-efficiency particulate air (HEPA) change out	As determined from surveillances
• HEPA aerosol test	Determined from regulatory requirements
• Vent and balance on canyon ventilation HEPA filters	As determined from surveillances
• Replace canyon ventilation HEPA filters	As determined from surveillances
• Canyon ventilation stack monitoring system inspections	Determined from regulatory requirements
• Potential cold weather protection	As defined in the Project Hanford Management Contract cold weather protection program.

4.0 QUALITY ASSURANCE

The DOE requires the S&M contractor to comply with the requirements of Title 10, Code of Federal Regulations, Part 830, Subpart A, *Quality Assurance Requirements* (10 CFR 830), DOE O 414.1C, Contractor Requirements Document (CRD), *Quality Assurance*, and State and Federal Environmental Regulations, for the establishment and implementation of its quality assurance (QA) program. The S&M contractor's Quality Assurance Program Description (QAPD), which is approved by DOE, describes the S&M contractor's implementation of these requirements. The QAPD is also the management system used for the conduct of environmental programs that acquire, generate, compile, report and use environmental data and technology. The S&M contractor QA program, as described by its QAPD, is to be applied on a graded basis to S&M contractor activities.

The QAPD requires the S&M Contractor to establish and implement QA program/project plans for specific quality-affecting activities. These plans identify the applicable QA requirements, how the requirements are implemented, and the responsibilities, interfaces, and authority for their implementation. These plans also incorporate other local, state, and federal government QA requirements as established in applicable permits, agreements, orders, regulations, laws, codes, and standards.

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5.0 TRAINING AND QUALIFICATION

The DOE requires that the S&M contractor training and qualification programs be established and implemented to satisfy the requirements of 10 CFR 830.122(b), "Criterion 2 – Management/Personnel Training and Qualification," and DOE O 414.1C CRD, Section 3.b, "Management/Criterion 2 – Personnel Training and Qualification." (See Section 4.0, *Quality Assurance*.)

In addition, training requirements for S&M personnel performing dangerous/mixed waste duties must also meet the standards of WAC 173-303-330 and the requirements as identified in Section 6.0 and Table 6.1.

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6.0 ENVIRONMENTAL COMPLIANCE/PROTECTION

This section identifies environmental compliance/protection requirements that are applicable to the S&M scope of work and has been prepared in accordance with the Tri-Party Agreement Action Plan, Section 8.6, "Surveillance and Maintenance Phase," S&M phase for facilities.

The S&M contractor is required to comply with all environmental laws, regulations, and procedures applicable to the work being performed under the Contract. This includes, but is not limited to, compliance with applicable federal, state and local laws and regulations, interagency agreements such as the Tri-Party Agreement, consent orders, consent decrees, and settlement agreements between DOE and federal and state regulatory agencies.

The DOE requires that the S&M contractor must establish, implement, and maintain an environmental protection program in accordance with the provisions of CRD DOE O 450.1, *Environmental Protection Program.* This CRD requires contractors to integrate numerous environmentally related requirements already placed on it by existing statutes, regulations, and policies through the use of an Environmental Management System (EMS) incorporated into an Integrated Environmental Safety and Health Management System (ISMS). EMS requirements must be addressed in the contractor's ISMS, which must be submitted for DOE review and approval under DEAR 970.5223-1, *Integration of Environment, Safety, and Health into Work Planning and Execution.*

During the PUREX deactivation, major radioactive sources and/or dangerous chemicals and wastes were removed, stabilized, excessed, or disposed to meet the criteria identified in WHC-SD-WM-TPP-053. This included removal of dangerous waste constituents to a minimum pumpable heel from accessible tanks and vessels identified as treatment, storage, and/or disposal (TSD) units in the PUREX Complex RCRA Part A Permit Application.

The Hazardous Material Remaining at the PUREX Facility (Appendix A) identifies and describes the material, location, and quantity of mixed waste and hazardous materials covered by the scope of this plan. Hazards associated with these materials are minimal due to their remote locations and existing form.

Dangerous waste generation and disposal are not expected during S&M. However, waste generated will be handled in compliance with the applicable regulatory, environmental, and waste management requirements. Compliance with the RCRA requirements found in WAC 173-303 and with the PUREX Complex Part A Permit Application during the S&M phase are addressed in Table 6-1.

6.1 PUREX FACILITY AIR PERMITTING

Under the US Department of Energy Hanford Site Radioactive Air Emissions License #FF-01, the DOE Hanford Site, and PUREX specifically, are licensed for airborne radioactive emissions. The FF-01 license is issued by the State of Washington, Department of Health.

6.2 RECORD KEEPING/DOCUMENTATION

Records and documents are retained at the S&M contractor's records area.

Documentation assembled as a means of documenting completion of endpoints are located in the endpoint files at the S&M records area. These records include the following:

- Canyon cell arrangement drawings.
- Certified vendor information of operating and mothballed systems.

- PUREX Facility Hazardous Material Remaining after Deactivation List.
- Pre-Closure Work Plan.
- Description of conditions or limitations applicable to criticality prevention.
- Deactivation work plans.
- Descriptions/photos of Case 2 spaces, internal/no access expected.
- Electrical distribution drawings of new operational systems.
- Index identifying drawings and corresponding titles of essential and downgraded facility drawings.
- Final radiological surveys and maps.
- Fire Hazard Analysis.
- Radiological control surveillances and data of current postings.
- Identified industrial space hazards.
- Confined space program.
- Resolution of remaining outstanding Tri-Party Agreement (Ecology, et al, 2003) and regulatory commitments.
- S&M safety evaluations documentation.
- S&M phase updated Facility Environmental Monitoring Plan.
- S&M phase updated Building Emergency Plan.
- S&M phase updated Safety Equipment List.
- S&M phase updated Final Safety Analysis/Safety Authorization Basis documentation.
- Special nuclear material inventory.
- Structural and roof evaluations.
- S&M procedures.
- Unusual occurrence reports considered relevant and informative for S&M.
- PUREX Plant Dangerous Waste Part A Permit Application.
- PUREX Storage Tunnels Dangerous Waste Permit Application,
- Prevention of Significant Deterioration for NOx Emissions Permit.
- WDOH Radioactive Air Emissions Permit, FF-01.
- Waste characterization data for egress waste, historical radiation survey data, and other radiological records.
- An administrative record was established for the PUREX Facility as described on Table 9-3 of the Tri-Party Agreement Action Plan (Ecology et al. 2003). The administrative record for PUREX contains the following documents:
  - RCRA Analytical Data for PUREX TSDs.
  - PUREX Pre-Closure Work Plan.
  - *Hanford Facility Dangerous Waste Permit Application, PUREX Storage Tunnels*, DOE/RL-90-24, Rev. 2.

Operating records and regulatory documentation generated during this S&M program, concerning dangerous waste management, are managed in accordance with the WAC 173-303-210/220 and are maintained in a regulatory file.

6.3 HAZARDOUS MATERIAL PROTECTION

During the S&M program, the PUREX Facility complies with the applicable requirements and as low as reasonably achievable (ALARA) considerations for control of potential personnel exposures to hazardous materials. Hazardous material protection requirements are accomplished by complying with the S&M contractor's safety and health procedures.

6.4 INSTITUTIONAL CONTROLS

Institutional controls do not apply to activities addressed by the PUREX S&M plan because a CERCLA decision document has not been issued. Once a CERCLA decision document is issued for the PUREX facility, the identified institutional controls will be implemented as required. Site security and access control are implemented as part of S&M activities.

Table 6-1. PUREX Regulatory Compliance during Surveillance and Maintenance.

DANGEROUS WASTE REGULATIONS	S&M COMPLIANCE APPLICABILITY
Introductory Regulations WAC 173-303-010 to WAC 173-303-060	Dangerous waste generation and disposal are not expected during the PUREX S&M phase. However, waste generated will be designated in compliance with the S&M contractor's waste management procedures.
Dangerous Waste Designation WAC 173-303-070 to WAC 173-303-110	Dangerous waste generation and disposal are not expected during the PUREX S&M phase. However, waste generated will be designated in compliance with the S&M contractor's waste management procedures.
General Recycling Requirements WAC 173-303-120	N/A: No recycling, reclaimed, or recovered dangerous waste exists during the PUREX S&M phase.
Prohibitions and Restrictions WAC 173-303-140 to WAC 173-303-141/40 CFR 268	N/A: No land disposal will occur during the PUREX S&M phase. However, the Annual Report on Hanford Site Land Disposal Restrictions for Mixed Waste is updated annually as necessary.
Spills & Discharge Into the Environment WAC 173-303-145 and 40 CFR 302	Notifications and responses for spills and discharges of dangerous waste or hazardous substances into the environment during the PUREX S&M phase are addressed in the S&M contractor's spill and response procedures.
Division, Dilution, & Accumulation WAC 173-303-150	Dangerous waste generation and disposal is not expected during the PUREX S&M phase. However, waste generated will be handled in compliance with the S&M contractor's waste management procedures.
Containers WAC 173-303-160 to WAC 173-303-161	Dangerous waste generation and disposal are not expected during the PUREX S&M phase. However, containers used as a result of waste generated will be managed in compliance with the S&M contractor's waste management procedures.
Generator Requirements WAC 173-303-170 to WAC 173-303-230	Dangerous waste generation and disposal are not expected during the PUREX S&M phase. However, waste generated will be managed in compliance with the S&M contractor's waste management procedures.
Transporter Requirements WAC 173-303-240 to WAC 173-303-270	Dangerous waste generation and disposal are not expected during the PUREX S&M phase. However, waste generated will be transported in compliance with the S&M contractor's waste management procedures.

Table 6-1. PUREX Regulatory Compliance during Surveillance and Maintenance.

DANGEROUS WASTE REGULATIONS	S&M COMPLIANCE APPLICABILITY
Notice of Intent WAC 173-303-280 Siting Criteria WAC 173-303-282	Not applicable during the PUREX S&M phase.
Performance Standards WAC 173-303-283	This section requires identification of performance standards for maintaining dangerous waste facilities to the maximum extent practical given the limits of technology to prevent endangerment to people and the environment, as specified. Compliance will be met through adherence to this S&M plan.
Required Notices WAC 173-303-290	N/A: No waste sources outside the Hanford site are received by the PUREX facility.
General Waste Analysis WAC 173-303-300	The purpose of this section is to confirm knowledge about dangerous waste before treatment, storage, and/or disposal. Appendix A lists the mixed waste remaining in the PUREX Complex TSD units. Dangerous waste generation and disposal is not expected during the PUREX S&M phase. However, waste generated will be designated in compliance with the S&M contractor's waste management procedures. A Waste Analysis Plan for the TSD units will not be maintained as long as no waste is accepted into the PUREX Complex TSD units, and as long as no samples of the mixed waste are acquired from the mixed waste managed in the PUREX Complex TSD units.
Security WAC 173-303-310	Addressed in Safeguards & Security section of this S&M plan.
General Inspection WAC 173-303-320	Routine Surveillances are performed as identified in this S&M plan. No TSD unit inspections or surveillances are performed since all of the TSD units are in un-accessible portions of the PUREX Complex.
Personnel Training WAC 173-303-330	Training is provided to meet the dangerous waste management duties identified in this table relating to WAC 173-303-330 compliance. A training plan will be maintained in accordance with WAC 173-303-330(2).
Construction Quality Assurance Program WAC 173-303-335	Not applicable during S&M.
Preparedness and Prevention WAC 173-303-340	Addressed in Section 8.0, Emergency Management, of this S&M plan.
Contingency Plan/Emergency Procedures WAC 173-303-350	Addressed in Section 8.0, Emergency Management, of this S&M plan.
Manifest System WAC 173-303-370	Dangerous waste will not be received from offsite sources during S&M.

Table 6-1. PUREX Regulatory Compliance during Surveillance and Maintenance.

DANGEROUS WASTE REGULATIONS	S&M COMPLIANCE APPLICABILITY
Facility Record Keeping WAC 173-303-380	Dangerous waste generation is not expected during S&M. However, operating records for mixed waste generated or managed at the facility are compliant with the S&M contractor's waste management procedures And Section 6.0 of this S&M Plan.
Other General Requirements WAC 173-303-395	Generation and disposal of ignitable, reactive, or incompatible waste during S&M are not expected. However, waste generated will be managed in compliance with the S&M contractor's waste management procedures.
Facility Reporting WAC 173-303-390	Dangerous waste from an offsite source is not expected during S&M. Therefore, un-manifested waste reports will not be applicable. Supporting information for the Hanford Site Annual Dangerous Waste, Hanford Site Land Disposal Restrictions for Mixed Waste Report, and any applicable reports will be prepared and submitted as required by the department.
Interim Status Treatment, Storage, and Disposal Facility Standards WAC 173-303-400/ 40 CFR 265.1101(c)(4)/ 40 CFR 255 Subpart J PUREX Plant RCRA Part A Permit Application	Tank Systems During the PUREX deactivation, TSD tanks and vessels identified in the PUREX Plant Dangerous Waste Permit Application, Part A Form were flushed until the solutions no longer designated as dangerous waste. These tank systems are identified in the PUREX Plant Vessel Table in the Part A Form. These solutions were removed leaving a non-dangerous heel per the *Data Quality Objectives for PUREX Deactivation Flushing,* WHC-SD-EN-TI-283, Rev. 0. Removal of the dangerous waste solutions ensured that the vessels were left in a state for minimum surveillance and maintenance until subsequent closure. Therefore, per the Tri-Party Agreement M-80-94-01 agreement, no surveillances of the dangerous waste units or ancillary equipment are performed. Containment Building The PUREX Containment Building, the 202-A canyon will continue to store dangerous waste per the PUREX Plant Part A Permit Application during the S&M phase. Monitoring the differential pressure of the canyon during S&M will satisfy the 40 CFR 265.1101(c)(4) requirement to maintain the containment building's integrity. No additional surveillance of the dangerous waste or ancillary equipment will be performed to satisfy this requirement.
Permits WAC 173-303-800 to WAC 173-303-840	The only permitting obligation will be to maintain the Part A Permit Application.

Table 6-1. PUREX Regulatory Compliance during Surveillance and Maintenance.

DANGEROUS WASTE REGULATIONS	S&M COMPLIANCE APPLICABILITY
Toxic Substance Control Act and Clean Air Act Requirements	
Polychlorinated Biphenyls (PCB) 40 CFR 761 Subparts D and G	PCBs may exist in transformers, ballast, and lubricants/oils once used in the plant. PCB waste generation is not expected during the PUREX S&M phase. However, waste generated will be managed in compliance with the applicable requirements.
Asbestos 40 CFR 61.150	Undetermined quantities of asbestos exist throughout the plant as a solid component. Asbestos waste generation is not expected during the PUREX S&M phase. However, waste generated will be managed in compliance with the applicable requirements.
Airborne Radionuclides 40 CFR 61, Subparts A and H WAC 173-480 WAC 246-247 The Department of Energy Hanford Site Radioactive Air Emissions License #FF-01	Minor levels of airborne radionuclides continue to be associated with the plant and contaminated structures. Air emissions abatement and monitoring, and associated testing, maintenance, quality assurance, recordkeeping, reporting and notifications will continue to be conducted in compliance with the FF-01 license.

7.0 OCCUPATIONAL RADIOLOGICAL CONTROLS

This section provides a reference to the DOE ALARA policy and program, which includes but not limited to the following;

- External radiation exposure control;
- External dosimetry;
- Internal radiation exposure control;
- Internal dosimetry;
- Radiological protection instrumentation programs (both calibration and use);
- Respiratory protection program;
- Air monitoring;
- Radiological monitoring and contamination control;
- Radiological protection record keeping;
- Radiological area boundaries, posting, and controls;
- Radiological protection training; and
- Entry and exit control program.

The DOE requires the S&M contractor to establish, implement, and maintain a radiation protection program that satisfies the minimum requirements established by 10 CFR 835, *Occupational Radiation Protection Final Rule.*

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8.0 EMERGENCY MANAGEMENT

This section describes the DOE philosophy, objectives, and organization of the emergency preparedness functions for a spectrum of emergencies covering a range from local area emergencies to those that could affect persons off-site. This section addresses the activation of emergency organizations, assessment actions, notification processes, emergency facilities and equipment, training and exercises, and recovery actions.

The DOE requires the S&M contractor to comply with DOE Order 151.1A, *Comprehensive Emergency Management System*, CRD, DOE/Richland Operations Office (RL) (DOE/RL)-94-02. If an emergency or abnormal incident occurs, the situation will be responded to in accordance with the *Hanford Emergency Management Plan*, current revision, and DOE-0223, *Emergency Plan Implementing Procedures*, which establishes the emergency preparedness requirements for the Hanford Site. The S&M Contractor PUREX-specific emergency plan is written to meet a variety of requirements, including the RCRA contingency plan requirements for the PUREX Complex TSD units. Personnel are trained ahead of time to deal with emergencies or abnormal incidents through formal classroom instruction and drills.

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9.0 HEALTH AND SAFETY

This section describes the DOE programs to ensure the health and safety of the workforce. Other topical areas such as radiological controls and facility maintenance may be driven by health and safety requirements; therefore, health and safety are included throughout the plan.

9.1 FIRE HAZARD ANALYSIS

The DOE requires the S&M contractor to establish requirements for the preparation, maintenance and approval of a fire hazards analysis that comprehensively assesses the risk from fire within a DOE facility to determine whether the fire protection objectives of CRD O 420.1A, *Facility Safety*, Supplemental Contractor Requirements Document (SRCD) DOE O 420.1A, (Rev. 2) *Facility Safety*, and CRD O 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*, are met.

9.2 OCCUPATIONAL SAFETY AND HEALTH

The DOE requires the S&M Contractor to comply with Occupational Safety and Health Administration standards. DOE directive DOE O 440.1A, *Worker Protection Management for DOE Federal and Contractor Employees*, Attachment 2, CRD requires compliance (when applicable) to 29 CFR 1910, *Occupational Safety and Health Standards*, and 29 CFR 1926, *Safety and Health Regulations for Construction*, and several consensus standards. Applicability of the 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response Regulations (HAZWOPER) standards and the need for HAZWOPER training will be determined based on RL guidance.

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10.0 SAFEGUARDS AND SECURITY

The DOE requires the S&M contractor as the facility manager/asset owner to ensure protection is provided for all property, facilities and materials according to the provisions of CRD M 473.1-1 (Supplemented Rev. 0), *Physical Protection Program Manual*. This DOE procedure for controlling access to the facility provides for an evaluation of the adequacy of existing physical controls (e.g., fencing, signs, entrance points into exclusion areas, door locks, and other barriers), provides a plan for the placement and monitoring of intrusion alarms, and describes the duties and scheduling of security patrols.

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11.0 COST AND SCHEDULE

This section identifies the DOE cost and schedule of S&M activities. This section includes a summary table of S&M costs applicable to the facility. One surveillance, as a minimum, will be made each year. The frequency of routine S&M as identified in Section 3.0 of this plan are identified in the contractor's work and maintenance procedures.

The S&M contractor shall plan, acquire, utilize, maintain, and dispose of DOE assets in a cost-effective manner. The contractor shall use industry standards and a graded approach in complying with CRD O 430.1B, *Real Property Asset Management.* The DOE defines graded approach, as it applies to this CRD, as providing the depth of detail required and the magnitude of resources expended for a particular management element to be tailored to be commensurate with the element's relative importance to safety, environmental compliance, safeguards and security, programmatic importance, magnitude of hazard, financial impact, and/or other facility-specific requirements.

Table 11-1. Surveillance and Maintenance Cost Estimate.

Description	Total
FY 2008 TOTAL COST	$ 671,000
FY 2009 TOTAL COST	$ 505,000
TOTAL	$ 1,176,000

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12.0 REFERENCES

10 CFR 830, Subpart A, *Quality Assurance Requirements*, "Code of Federal Regulations," as amended.

10 CFR 835, *Occupational Radiation Protection*, "Code of Federal Regulations," as amended.

29 CFR 1910, *Occupational Safety and Health Standards*, "Code of Federal Regulations," as amended.

29 CFR 1926, *Occupational Safety and Health Standards for the Construction Industry*, "Code of Federal Regulations," as amended.

40 CFR 61, *National Emissions Standards for Hazardous Air Pollutants*, Subpart H, "National Emissions Standards for Emissions of Radionuclide Other Than Radon from Department of Energy Facilities," *Code of Federal Regulations*, as amended.

BWHC-9753209, *Request for Review and Approval 2nd Rev DST Waste Profile for Operational Decisions Sheet for PUREX Tanks V11 & 216-A-TK-2*

CRD M 473.1-1 (Supplemented Rev. 0), *Physical Protection Program Manual*

CRD O 420.1A, *Facility Safety*, Supplemental Contractor Requirements Document (SRCD)

CRD O 430.1B, *Real Property Asset Management.*

CRD O 433.1, *Maintenance Management Program for DOE Nuclear Facilities*

CRD O 450.1, *Environmental Protection Program*

DEAR 970.5223.1, *Integration of Environment, Safety, and Health into Work Planning and Execution*

DOE O 414.1C, *Contractor Requirements Document*, "Quality Assurance"

DOE O 420.1A, (Rev. 2) *Facility Safety*, DOE 151.1A

DOE Order 440.1, *Worker Protection Management for DOE Federal and Contractor Employees,* as amended, US Department of Energy, Washington, D.C.

DOE-0223, *Emergency Plan Implementing Procedures*

DOE/RL-90-24, *Hanford Facility Dangerous Waste Permit Application, PUREX Storage Tunnels,* U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-90-39, *Hanford Facility Dangerous Waste Permit Application, Double-Shell Tank System,* U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-94-02, *Hanford Emergency Response Plan*, as amended, US Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE-RL, 2003, *Hanford Federal Facility Agreement and Consent Order,* Washington State Department of Ecology, U.S. Environmental Protection Agency,

U.S. Department of Energy, Richland Operations Office, Olympia, Washington, amended periodically.

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq., as amended.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Codes*, as amended.

WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides," *Washington Administrative Codes*, as amended.

WAC 246-247, "Radiation Protection – Air Emissions," *Washington Administrative Codes*, as amended.

WHC-SD-WM-TPP-053, 1995, *PUREX Deactivation End Points*, as amended, Fluor Daniel Hanford, Inc., Richland, Washington.

WHC-SD-TI-EN-283, *Data Quality Objectives for PUREX Deactivation Flushing*

APPENDIX A

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

The information for this appendix was taken directly from the submittal to document closure of the end point described as, "Remaining Hazardous Substances/Dangerous Waste Documentation," per the PUREX End Points Document, WHC-SD-WM-TPP-053.

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
GENERAL	Lead as a solid component, such as paint, light bulb contacts, washers affixing transite, sanitary water line joints packed with lead mesh; steam, air, and water safety relief valve seals; components of control panels – all abandoned in place and stable during surveillance and maintenance (S&M). Zinc used in galvanized piping; zinc, silver, and lead contacts are used in the electrical system. Lead and zinc were used as soldering in the electrical and plumbing systems. All stable during S&M. Mercury in thermostats and in electronic switches (i.e., electronic switches) throughout 202-A. Mercury vapor lights were also used for exterior lighting. Asbestos abandoned throughout the plant as a solid component such as in transite siding, utility line insulation, and gasket material. Asbestos is especially notable in 206-A and 293-A. Refer to Asbestos Assessment for additional descriptions of asbestos remaining at the Plutonium-Uranium Extraction (PUREX) Facility. Unknown organic in liquid films, greases, and solid residues in bearings and gearboxes throughout the plant. Stable during S&M period. Leaks of small amounts of chemicals to the floors during operations and S&M. Undetermined quantities of polychlorinated biphenyls (PCB) exist in transformers, ballasts, and lubricants/gear oil once used	

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
	throughout the plant.	
151 DIVERSION BOX	Per the Double-Shell Tank System Part B Permit Application, DOE/RL-90-39 (DST), the diversion box is permitted to provide containment for leaks in transfer lines. Leaks have potential for containing hazardous waste constituents. See DST Part B Permit Application for additional information. The diversion box's final operational and regulatory status may change at DST Part B Permit Application discretion.	
151 DIVERSION BOX EQUIPMENT 241-A-151 Diversion Box Equipment (Transfer Lines)	Per the DST Part B Permit Application, the diversion box is permitted to provide containment for leaks in transfer lines. Leaks have potential for containing hazardous waste constituents. See the DST Part B Permit Application for additional information. The diversion box's final operational and regulatory status may change at DST Part B Permit Application discretion.	
151 DIVERSION BOX EQUIPMENT 241-A-151 Diversion Box Equipment (241-A-302A Catch Tank)	Per the DST Part B Permit Application, the catch tank is permitted for hazardous waste storage. See the DST Part B Permit Application for additional information. The tank's final operational and regulatory status may change at DST Part B Permit Application discretion.	Heel Volume: 330 gallons Final solution analysis: pH: 11.432 Cd: 1.02 ppm Cr: 0.245 ppm
202-A FACILITY EXTERIOR 291-AK	See "General" Section on this list for description of remaining material.	
202-A FACILITY EXTERIOR West PRV	See "General" Section on this list for description of remaining material.	
202-A FACILITY EXTERIOR	See "General" Section on this list for description of remaining material.	
202-A PUMP/TRAP PITS	See "General" Section on this list for description of remaining material.	
202-A PUMP/TRAP PITS EQUIPMENT	See "General" Section on this list for description of remaining material.	
203-A CONTROL ROOM AND PUMPHOUSE	See "General" Section on this list for description of remaining material.	
203-A CONTROL ROOM AND PUMPHOUSE EQUIPMENT	All tanks in the 203-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid in these areas. Vessels located in 203-A are listed in the PUREX Plant	Trace amounts to none.

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
	Vessel Table in the Part A Form.	
203-A DIKED AREA	All tanks in the 203-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid in these areas. Vessels located in 203-A are listed in the PUREX Plant Vessel Table in the Part A Form.	Trace amounts to none.
203-A TRUCK PAD	See "General" Section on this list for description of remaining material.	
203-A TRUCK PAD PIPING	All tanks in the 203-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid in these areas.	Trace amounts to none.
206-A FRACTIONATOR	Asbestos	Large amount of friable inside fractionator building.
FRACTIONATOR EQUIPMENT	See "General" Section on this list for description of remaining material.	
FRACTIONATOR INSTRUMENT SHACKS 1 & 2	See "General" Section on this list for description of remaining material.	
FRACTIONATOR EXTERIOR	See "General" Section on this list for description of remaining material.	
211-A	All tanks in the 211-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid, sulfuric acid, KOH, NOH, TBP, NPH, AFAN and ANN in these areas. Vessels located in 211-A are listed in the PUREX Plant Vessel Table in the Part A Form.	
211-A EXTERIOR	See "General" Section on this list for description of remaining material.	
211-A EXTERIOR PIPING	All tanks in the 211-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid, sulfuric acid, KOH, NOH, TBP, NPH, AFAN and ANN in these areas.	
212-A	Fission Product Load Out Station Lead Shielding around piping	Quantity unknown
212-A EXTERIOR	See "General" Section on this list for description of remaining material.	
213-A	See "General" Section on this list for description of remaining material.	
213-A EXTERIOR	See "General" Section on this list for description of remaining material.	

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
214-A/B/C/D	See "General" Section on this list for description of remaining material.	
216-A SPUD CELLAR	Lead Shielding Wrapped around pipe (18"x 24"x 1/8")	~10 kg (22 lb)/Solid
216-A-42 DIVERSION BASIN	See "General" Section on this list for description of remaining material.	
216-A-42A PUMP STATION	See "General" Section on this list for description of remaining material.	
216-A-42B VALVE BOX	See "General" Section on this list for description of remaining material.	
216-A-42C VALVE BOX	See "General" Section on this list for description of remaining material.	
216-A-42D DIVERSION BOX	See "General" Section on this list for description of remaining material.	
216-A-42E DIVERSION BOX	See "General" Section on this list for description of remaining material.	
291-A STEAM TURBINE	See "General" Section on this list for description of remaining material.	
291-A EXHAUST FAN PAD	See "General" Section on this list for description of remaining material.	
291-AD	See "General" Section on this list for description of remaining material.	
291-AD MONITORING EQUIPMENT	See "General" Section on this list for description of remaining material.	
291-AE	See "General" Section on this list for description of remaining material.	
291-AE FILTERS	See "General" Section on this list for description of remaining material.	
291-AE EXTERIOR	See "General" Section on this list for description of remaining material.	
291-AH	See "General" Section on this list for description of remaining material.	
291-AH MONITORING EQUIPMENT	See "General" Section on this list for description of remaining material.	
292-AB	Lead Shielding PING Monitor MFRAM Monitor	~113.7 kg (250 lb)/Solid ~102.4 kg (225 lb)/Solid
292-AB EXTERIOR	See "General" Section on this list for description of remaining material.	
293-A	Dissolver Off-Gas Station Asbestos Lead: 2 (350 lb) lead shielding pigs Basement (2) 300 lb lead shielding pigs encased by one layer of stainless steel	Large amount of friable inside building 318.2 kg (700 lb)/Solid 273 kg (600 lb)/Solid

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
	(1) 100 lb lead beta cam	45.5 kg (100 lb)/Solid
293-A EQUIPMENT	See "General" Section on this list for description of remaining material.	
294-A	See "General" Section on this list for description of remaining material.	
294-A SYSTEMS	See "General" Section on this list for description of remaining material.	
2701-AB BADGEHOUSE	See "General" Section on this list for description of remaining material.	
2701-AB BADGEHOUSE EXTERIOR	See "General" Section on this list for description of remaining material.	
2709-A	Building has been removed from compound.	
2711-A and 2712-A	See "General" Section on this list for description of remaining material.	
2711-A and 2712-A EQUIPMENT	See "General" Section on this list for description of remaining material.	
2714-A	See "General" Section on this list for description of remaining material.	
2714-U SHED	See "General" Section on this list for description of remaining material.	
2714-U EXTERIOR	See "General" Section on this list for description of remaining material.	
AQUEOUS MAKEUP ROOMS (AMU) AND ANNEX EXTERIOR	Lead washers affixing transite. Vessels located in AMU are listed in the PUREX Plant Vessel Table in the Part A Form.	Throughout building exterior
AMU	See "General" Section on this list for description of remaining material.	
AMU ELEVATOR	See "General" Section on this list for description of remaining material.	
AMU 4TH FLOOR	See "General" Section on this list for description of remaining material.	
295-A ASD SHACK	See "General" Section on this list for description of remaining material.	
ASD SYSTEM	See "General" Section on this list for description of remaining material.	
ASD CAISSON	See "General" Section on this list for description of remaining material.	
ASD VALVE PIT	See "General" Section on this list for description of remaining material.	
CANYON EAST CRANE	See "General" Section on this list for description of remaining material.	
CANYON SLAVE CRANE	See "General" Section on this list for description of remaining material.	
CANYON WEST CRANE	See "General" Section on this list for description of remaining material.	
CANYON POOL CELL AND SLUG STORAGE BASIN	Lead counterweights, wrapped in a bundle, are on the south end of a lifting yolk located on a rack in the slug storage basin.	401 kg (~885 lb)/Solid Approximately 30 lead counterweights (2"x3"x12")

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
CANYON C CELL DECK ACCESS AIRLOCK	See "General" Section on this list for description of remaining material.	
CANYON F CELL DECK VIEWING WINDOW	Lead in viewing window.	Unknown quantity
CANYON/A-CELL	Ag in Silver Reactor	Unknown quantity: Full charge is 250 lb $AgNO_3$ (670 g-mol Ag)
	Dissolver moderator lining: cadmium	~43 kg (~94.6 lb)
	Dissolver thermowells: mercury	~38 kg (~83.6 lb)/Liquid
	Lead counterweights	89 kg (195.9 lb)/Solid
CANYON/B-CELL	Ag in Silver Reactor	Unknown quantity: Full charge is 250 lb $AgNO_3$ (670 g-mol Ag)
	Dissolver moderator lining: cadmium	~43 kg (~94.6 lb)
	Dissolver thermowells: mercury	~38 kg (~83.6 lb)/Liquid
	Lead counterweights	167 kg (367.3 lb)/Solid
CANYON/C-CELL	Ag in Silver Reactor	Unknown quantity: Full charge is 250 lb $AgNO_3$ (670 g-mol Ag)
	Dissolver lining: cadmium	~43 kg (~94.6 lb)
	Dissolver thermowells: mercury	~38 kg (83.6 lb)/Liquid
	Lead counterweights	111.9 kg (246.2 lb)/Solid
CANYON/D-CELL	Lead counterweights Vessels located in Cell D are listed in the PUREX Plant Vessel Table in the Part A Form.	24.1 kg (53 lb)/Solid
CANYON/E-CELL	Lead counterweight, Jumpers. Vessels located in Cell E are listed in the PUREX Plant Vessel Table in the Part A Form	254.3 kg (559.5 lb)/Solid 410.1 kg (902.2 lb)/Solid
CANYON/F-CELL	Lead counterweights, Shielding Vessels located in Cell F are listed in the PUREX Plant Vessel Table in the Part A Form.	1133.6 kg (2494 lb)/Solid 536.4 kg (1180 lb)/Solid
	A steel open top skid containing concrete chips from the floor of E Cell is stored in F Cell. The solid mixed waste in the canyon could consist of contaminated discarded canyon process equipment, jumpers (or isolated components thereof) or other material from the various onsite sources. Chromium in floor debris: concrete solids contaminated with solutions from E Cell process.	Trace amounts throughout E Cell floor
CANYON/G-CELL	Lead counterweights, Jumpers Vessels located in Cell G are listed in the PUREX Plant Vessel Table in the Part A Form.	531.8 kg (1170 lb)/Solid 90.9 kg (200 lb)/Solid

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication
CANYON/H-CELL	Lead counterweights Vessels located in Cell H are listed in the PUREX Plant Vessel Table in the Part A Form.	303.2 kg (664.9 lb)/Solid
	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication
CANYON/J-CELL	Lead counterweights, Jumpers Vessels located in Cell J are listed in the PUREX Plant Vessel Table in the Part A Form.	779 kg (1713.7 lb)/Solid 259.3 kg (570.5 lb)/Solid
	Cadmium: 4 Neutron monitor pigs (1 from J4, 3 from J6)	23.6 kg (52 lb) total/Solid
	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication
CANYON/K-CELL	Lead counterweights, Shielding, Jumpers Vessels located in Cell K are listed in the PUREX Plant Vessel Table in the Part A Form.	254.3 kg (559.5 lb)/Solid 32.1 kg (70.6 lb)/Solid 45.5 kg (100 lb)/Solid
	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication
CANYON/L-CELL	Lead counterweights Vessels located in Cell L are listed in the PUREX Plant Vessel Table in the Part A Form	310.1 kg (682.3 lb)/Solid
CANYON DECK	Lead sheets on deck: (2) 2'x4'x1/16"	13.7 kg (30 lb)/Solid
CANYON LOBBY	See "General" Section on this list for description of remaining material.	
CHANGE ROOMS	See "General" Section on this list for description of remaining material.	
COMPRESSOR ROOM	See "General" Section on this list for description of remaining material.	
COMPRESSOR ROOM PROCESS AND INSTRUMENT AIR	See "General" Section on this list for description of remaining material.	
CONTROL ROOMS, OFFICES AND MAINTENANCE SHOPS	See "General" Section on this list for description of remaining material.	
HEAD END, CENTRAL, POWER CONTROL ROOMS AND OFFICES	See "General" Section on this list for description of remaining material.	
HEAD END, CENTRAL, POWER CONTROL ROOMS AND OFFICE LIGHTING	See "General" Section on this list for description of remaining material.	
271-AB	See "General" Section on this list for description of remaining material.	

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
271-AB LIGHTING	See "General" Section on this list for description of remaining material.	
MAINTENANCE SHOPS	See "General" Section on this list for description of remaining material.	
SWP LOBBY	See "General" Section on this list for description of remaining material.	
295-AC CSL SHACK	See "General" Section on this list for description of remaining material.	
CSL SYSTEM	See "General" Section on this list for description of remaining material.	
CSL CAISSON S	See "General" Section on this list for description of remaining material.	
295-AD CWL SHACK	See "General" Section on this list for description of remaining material.	
CWL SYSTEM	See "General" Section on this list for description of remaining material.	
CWL CAISSON	See "General" Section on this list for description of remaining material.	
CWL PIT	Lead counterweight.	2.3 kg (5 lb)/Solid
EAST MEZZANINE AND CANYON SUPPORT ROOMS	Residual hydraulic oil in pneumatic system lines.	Quantity unknown.
EAST SWITCH GEAR ROOM	See "General" Section on this list for description of remaining material.	
HOT SHOP	See "General" Section on this list for description of remaining material.	
LAB CENTER CORRIDOR AND CHANGE/LUNCH ROOMS	See "General" Section on this list for description of remaining material.	
LAB HVAC ROOM	Lead Shielding: 6 lead sheets (6"x18"x1/8")	2.5 kg (5.5 lb)/Solid
LAB HVAC EQUIPMENT	See "General" Section on this list for description of remaining material.	
LAB ICP FILTER	See "General" Section on this list for description of remaining material.	

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
LABS	Decon Room (under hood 31): 7 lead bricks (25 lb each) 2 lead sheets (12"x12"x1/4") Outside Lab 5 in Corridor in Door 4: 2 lead sheets (12"x12"x1/8") 2 lead sheets (6"x14"x1/8") Outside Lab 5 in Corridor in Door 6: 4 lead sheets (12"x12"x1/8") Outside Lab 5 in Corridor in Door 10: 1 lead sheet (1"x8"x30")	 79.5 kg (175 lb)/solid 13.4 kg (29.4 lb)/solid 7.4 kg (14.7 lb)/solid 3.9 kg (8.6 lb)/solid 13.4 kg (29.4 lb)/solid 44.6 kg (98.2 lb)/solid
LAB COUNTING ROOM EQUIPMENT	See "General" Section on this list for description of remaining material.	
LAB HOODS	See "General" Section on this list for description of remaining material.	
LAB DOCK	See "General" Section on this list for description of remaining material.	
LOADING DOCKS	See "General" Section on this list for description of remaining material.	
M-CELL	See "General" Section on this list for description of remaining material. Vessels located in M Cell are listed in the PUREX Plant Vessel Table in the Part A Form	
MOBILE OFFICES	See "General" Section on this list for description of remaining material.	
N-CELL	Lead shielding: 8 Leaded glass panels for Upper and Lower Control Room. 2 Lead-filled vault doors to Lower Control Room.	 3869.1 kg (8512 lb)/Solid 3 Upper and 3 Lower at 568.2 kg (1250 lb) each 2 Upper at 230 kg (506 lb) each ~1818.2 kg (~4000 lb) total/Solid

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
N-CELL GLOVEBOXES	Bagging Box, Conveyor Housing, and Secondary Canning Glovebox with stainless steel and lead sides. Lead glass and packing on Secondary Canning Glovebox Lead Acryl window on Vessel Glovebox Powder Load Out and Maintenance Glovebox with stainless steel and lead sides. Lead Acryl, both attached and detached on Calciner Glovebox. Lead packing as needed to fill window installation cavities.	340.9 kg (750 lb) total/Solid 113.6 kg (250 lb) each 77.3 kg (170 lb)/Solid 8.2 kg (18 lb)/Solid 527.3 kg (1160 lb)/Solid Quantity unknown Quantity unknown
N-CELL ROOM EXHAUST	See "General" Section on this list for description of remaining material.	
PAINT SHOP	See "General" Section on this list for description of remaining material.	
295-AB PDD SHACK	See "General" Section on this list for description of remaining material.	
PDD SYSTEM	See "General" Section on this list for description of remaining material.	
PDD CAISSON	Aerosol cans (contents unknown)	2 buckets with miscellaneous tools and aerosol cans
PDD SAMPLE PIT	See "General" Section on this list for description of remaining material.	
NEW PDD SHACK	See "General" Section on this list for description of remaining material.	
PIPE AND OPERATING GALLERY	See "General" Section on this list for description of remaining material.	
PIPE AND OPERATING GALLERY SYSTEMS	See "General" Section on this list for description of remaining material.	
PIV ROOM	See "General" Section on this list for description of remaining material.	
PR ROOM	Lead shielding: Q-Cell piping (Q686 and Q619)	Quantity unknown (piping runs along PR Rm.)
PR ROOM EXHAUST	See "General" Section on this list for description of remaining material.	
PR ROOM GLOVEBOXES	Lead shielding: L14 Loadout Glovebox	294.5 kg (648 lb)/Solid

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
Q-CELL	Lead-filled door to Process Cell used as shielding. Q-Cell Outer Lobby (18) 86.75" x 35.5" x 2" doors with lead plexiglass viewing windows stored at the bottom of the Q Cell stairwell near Column 9.	1818.2 kg (4000 lb)/Solid 18 leaded plexiglass viewing windows. (percentage of lead unknown)
Q CELL CONTROL ROOM	See "General" Section on this list for description of remaining material.	
Q CELL LOADOUT ROOM	See "General" Section on this list for description of remaining material.	
Q CELL GLOVEBOXES	Leaded glass in 31 portholes on hood face used as shielding.	140.9 kg (310 lb) total weight (percentage lead content unknown)/Solid
Q CELL AMU	See "General" Section on this list for description of remaining material. Vessels located in Q Cell AMU are listed in the PUREX Plant Vessel Table in the Part A Form.	
Q CELL MAINTENANCE HOOD ROOM	See "General" Section on this list for description of remaining material.	
Q CELL VAULT ROOM	See "General" Section on this list for description of remaining material.	
R-CELL	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication
R CELL EQUIPMENT	See "General" Section on this list for description of remaining material.	
R CELL EXTERIOR	See "General" Section on this list for description of remaining material.	

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
SAMPLE GALLERY	Six In Line Monitors (approx. 100 lb of lead clad in stainless steel in each monitor) 1 on G5 w/no lead counterweights. 2 on H3 w/(8) lead 25-lb counterweights. 1 on J4 w/(4) lead 25 lb counterweights. 1 on K4 w/(4) lead 25 lb counterweights. 1 on L2 w/(4) lead 25 lb counterweights. Lead Shielding on E3 and F15 Jet Air Valves. Lead Shielding on F26 Pipe Chase. Lead Shielding on Drip Tray left of J1 sampler. Manipulator Room 2 manipulators w/(4) 10 lb counterweights each. 1 portable lead shielding board approx. (4'x4'x1/2") Portable Lead Shielding Board 1 in front of Sampler U3 1 against column 13 Lead construction on ventilation containment located across of L4 sampler.	 273 kg (600 lb)/Solid plus 0 kg 91 kg (200 lb)/Solid 45 kg (100 lb)/Solid 45 kg (100 lb)/Solid 45 kg (100 lb)/Solid 2.3 kg (5 lb)/Solid Unknown Quantity/Solid approximately 25 lb/Solid 36 kg (80 lb)/Solid 213 kg (469 lb)/Solid 213 kg (469 lb)/Solid 213 kg (469 lb)/Solid Unknown Quantity/Solid
SAMPLE GALLERY CHEMICAL HEADERS	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY DECON HOOD	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY HOOD HVAC	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY HOOD HVAC STATION	See "General" Section on this list for description of remaining material. See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY IODINE MONITORS	DOG Iodine Monitor Lead cap Lead siding and a lead board underneath monitor. F1 Iodine Monitor Lead glass	 Unknown Quantity/Solid Unknown Quantity/Solid Unknown Quantity/Solid

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
SAMPLE GALLERY LOADIN HOODS	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY N-CELL HALON FIRE SYSTEM	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY N-CELL VACUUM PUMP	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY PDD NEUTRALIZATION	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY ROOM EXHAUST	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY SAMPLERS	<u>Samplers</u> Lead glass on sampler faces Lead doors part of original A-Type samplers' construction. (A3, B3, C3, D3, D4, D5 HOOD, E1, E6, F8, F10, F13, F15, F16, F18, F26, G2, G8, H1, H2, H3, J1, J-23-1, J-23-2, J21, and J22) Lead shielding (3'x6"x1/2") on E6 sampler counter. <u>D1 Cave</u> Covered and painted lead bricks: walls of D1 cave Lead glass of *D*1 cave <u>D5 Cave</u> 50 25-lb bricks on pipe chase above D5 cave Lead glass of D5 cave Two glove manipulators: (7)10 lb + (1) 25 lb lead counterweights per manipulator	Unknown Quantity/Solid 20 kg (44 lb)/Solid Unknown Quantity/Solid Unknown Quantity/Solid 568 kg (1250 lb)/Solid Unknown Quantity/Solid 86 kg (190 lb)/Solid
SAMPLE GALLERY WASTE COMPACTOR	See "General" Section on this list for description of remaining material.	
295-AA SCD SHACK	See "General" Section on this list for description of remaining material.	
SCD SYSTEM	See "General" Section on this list for description of remaining material.	
SCD CAISSON	See "General" Section on this list for description of remaining material.	
STORAGE GALLERY	Lead: shielding on floor at Column 32 (18" x 30" x 1/2") shielding blanket on northeast floor across from glovebox (24" x 12" x 1/4")	227.3 kg (~500 lb)/Solid ~13.3 kg (~30 lb)/Solid

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
STORAGE GALLERY SYSTEMS	See "General" Section on this list for description of remaining material.	
U-CELL	Asbestos Large amount of friable inside fractionator building. Vessels located in U Cell are listed in the PUREX Plant Vessel Table in the Part A	
U-CELL EQUIPMENT	See "General" Section on this list for description of remaining material.	
VENTILATION SUPPLY ROOMS	See "General" Section on this list for description of remaining material.	
PROCESS BLOWER ROOM	See "General" Section on this list for description of remaining material.	
SERVICE BLOWER ROOM	See "General" Section on this list for description of remaining material.	
HVAC AIR SUPPLY	See "General" Section on this list for description of remaining material.	
WEST SWITCH GEAR ROOM	See "General" Section on this list for description of remaining material.	
WHITE ROOM	See "General" Section on this list for description of remaining material.	
WHITE ROOM SYSTEMS	See "General" Section on this list for description of remaining material.	
YARD	See "General" Section on this list for description of remaining material.	
281-A DIESEL GENERATORS	See "General" Section on this list for description of remaining material.	
DIESEL GENERATORS	See "General" Section on this list for description of remaining material.	
CASE 4 202-A VENTILATION	See "General" Section on this list for description of remaining material.	
CASE 4 ELECTRICAL	See "General" Section on this list for description of remaining material.	
CASE 4 FACILITY OFF-GAS CONDENSATECATCH TANKS	Various chemical residue as a result of PUREX operations including corrosion by-products. Verified via TK-V11-1 sample results, process knowledge and correspondence BWHC-9753209 (BWHC 1997).	
CASE 5 PR ELEVATOR	See "General" Section on this list for description of remaining material.	
CASE 6 ELECTRICAL	See "General" Section on this list for description of remaining material.	
CASE 6 FH-V11-1 (#1 FILTER)	Ammonium Nitrate salts from gas phase reactions during PUREX operation and corrosion by-products. Identified via correspondence 17530-93-074 (WHC 1993).	
CASE 6 FH-V11-2	Various chemical residue as a result of PUREX operations including corrosion	

HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY

Location(*)	Material description	Quantity/state
(#2 FILTER)	by-products and Ammonium Nitrate salts. Verified present via TK-V11-1 sample results and correspondence BWHC-9753209	
CASE 6 HP STEAM	See "General" Section on this list for description of remaining material.	
CASE 6 SANITARY SEWER	See "General" Section on this list for description of remaining material.	
CASE 6 SANITARY WATER	See "General" Section on this list for description of remaining material.	
CASE 6 UTILITY RAW WATER	See "General" Section on this list for description of remaining material.	
RAILROAD CUT**	See "General" Section on this list for description of remaining material.	
RAILROAD STORAGE TUNNEL #1 AND #2 EXHAUST FANS**	See "General" Section on this list for description of remaining material.	
RAILROAD TUNNEL (BETWEEN VERTICAL DOOR AND WATER DOORS)**	Lead bricks covering 'HIGH RADIOACTIVE WASTE TRANSFER LINES# 9.14 m (30 ft), north of door B20 Lead blankets cover radioactive waste transfer lines encasement, 7.62 m (25 ft.) south of door B20 Lead blankets covering excavated concrete at entry to storage tunnel 2 (218-E-15) spur	287 lead bricks with a total weight of 7354.28 kg (16,301.6 lb) 20 lead blankets with a total weight of 1322.86 kg (2,546 lb) 2 lead blankets with a total weight of 83.48 kg (184 lb)
RAILROAD STORAGE TUNNELS 218-E-14 AND 218-E-15 **	The PUREX Storage Tunnels are an operating TSD unit. A description and inventory of the hazardous waste stored in the tunnel may be found in *Hanford Facility RCRA Permit, Part III, Chapter 3.*	
WATER FILLED DOORS	See "General" Section on this list for description of remaining material.	
WEST CRANE MAINTENANCE PLATFORM (WCMP)	Lead lined camera assembly on WCMP	Quantity unknown
ELECTRICAL POWER	See "General" Section on this list for description of remaining material.	

* See "General" section, for areas that do not contain specifically identifiable materials. This list is updated to reflect any additional findings during the PUREX facility deactivation activities.

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